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**WAC 296-62-07329 Vinyl chloride.**

(1) **Scope and application.**

- (a) This section includes requirements for the control of employee exposure to vinyl chloride (chloroethene), Chemical Abstracts Service Registry No. 75014.
- (b) This section applies to the manufacture, reaction, packaging, repackaging, storage, handling or use of vinyl chloride or polyvinyl chloride, but does not apply to the handling or use of fabricated products made of polyvinyl chloride.
- (c) This section applies to the transportation of vinyl chloride or polyvinyl chloride except to the extent that the department of transportation may regulate the hazards covered by this section.

(2) **Definitions.**

- (a) **“Action level”** means a concentration of vinyl chloride of 0.5 ppm averaged over an 8-hour work day.
- (b) **“Authorized person”** means any person specifically authorized by the employer whose duties require him/her to enter a regulated area or any person entering such an area as a designated representative of employees for the purpose of exercising an opportunity to observe monitoring and measuring procedures.
- (c) **“Director”** means the director of department of labor and industries or his/her designated representative.
- (d) **“Emergency”** means any occurrence such as, but not limited to, equipment failure, or operation of a relief device which is likely to, or does, result in massive release of vinyl chloride.
- (e) **“Fabricated product”** means a product made wholly or partly from polyvinyl chloride, and which does not require further processing at temperatures, and for times, sufficient to cause mass melting of the polyvinyl chloride resulting in the release of vinyl chloride.
- (f) **“Hazardous operation”** means any operation, procedure, or activity where a release of either vinyl chloride liquid or gas might be expected as a consequence of the operation or because of an accident in the operation, which would result in an employee exposure in excess of the permissible exposure limit.
- (g) **“Polyvinyl chloride”** means polyvinyl chloride homopolymer or copolymer before such is converted to a fabricated product.
- (h) **“Vinyl chloride”** means vinyl chloride monomer.

(3) **Permissible exposure limit.**

- (a) No employee may be exposed to vinyl chloride at concentrations greater than 1 ppm averaged over any 8-hour period, and
- (b) No employee may be exposed to vinyl chloride at concentrations greater than 5 ppm averaged over any period not exceeding 15 minutes.
- (c) No employee may be exposed to vinyl chloride by direct contact with liquid vinyl chloride.

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**WAC 296-62-07329 (Cont.)**

**(4) Monitoring.**

- (a) A program of initial monitoring and measurement shall be undertaken in each establishment to determine if there is any employee exposed, without regard to the use of respirators, in excess of the action level.
- (b) Where a determination conducted under subdivision (a) of this subsection shows any employee exposures without regard to the use of respirators, in excess of the action level, a program for determining exposures for each such employee shall be established. Such a program:
  - (i) Shall be repeated at least monthly where any employee is exposed, without regard to the use of respirators, in excess of the permissible exposure limit.
  - (ii) Shall be repeated not less than quarterly where any employee is exposed, without regard to the use of respirators, in excess of the action level.
  - (iii) May be discontinued for any employee only when at least two consecutive monitoring determinations, made not less than 5 working days apart, show exposures for that employee at or below the action level.
- (c) Whenever there has been a production, process or control change which may result in an increase in the release of vinyl chloride, or the employer has any other reason to suspect that any employee may be exposed in excess of the action level, a determination of employee exposure under subdivision (a) of this subsection shall be performed.
- (d) The method of monitoring and measurement shall have an accuracy (with a confidence level of 95 percent) of not less than plus or minus 50 percent from 0.25 through 0.5 ppm, plus or minus 35 percent from over 0.5 ppm through 1.0 ppm, plus or minus 25 percent over 1.0 ppm, (methods meeting these accuracy requirements are available from the director).
- (e) Employees or their designated representatives shall be afforded reasonable opportunity to observe the monitoring and measuring required by this subsection.

**(5) Regulated area.**

- (a) A regulated area shall be established where:
  - (i) Vinyl chloride or polyvinyl chloride is manufactured, reacted, repackaged, stored, handled or used; and
  - (ii) Vinyl chloride concentrations are in excess of the permissible exposure limit.
- (b) Access to regulated areas shall be limited to authorized persons.

**(6) Methods of compliance.** Employee exposures to vinyl chloride shall be controlled to at or below the permissible exposure limit provided in subsection (3) of this section by engineering, work-practice, and personal protective controls as follows:

- (a) Feasible engineering and work-practice controls shall immediately be used to reduce exposures to at or below the permissible exposure limit.
- (b) Wherever feasible engineering and work-practice controls which can be instituted immediately are not sufficient to reduce exposures to at or below the permissible exposure limit, they shall nonetheless be used to reduce exposures to the lowest practicable level, and shall be supplemented

**WAC 296-62-07329 (Cont.)**

by respiratory protection in accordance with subsection (7) of this section. A program shall be established and implemented to reduce exposures to at or below the permissible exposure limit, or to the greatest extent feasible, solely by means of engineering and work-practice controls, as soon as feasible.

- (c) Written plans for such a program shall be developed and furnished upon request for examination and copying to the director. Such plans shall be updated at least every six months.

**(7) Respiratory protection.**

- (a) General. For employees who use respirators required by this section, the employer must provide respirators that comply with the requirements of this section.
- (b) Respirator program. The employer must establish, implement, and maintain a respiratory protection program as required in chapter 296-842 WAC, except WAC 296-842-13005 and 296-842-14005.
- (c) Respirator selection. Respirators must be selected from the following table:

<b>Atmospheric concentration of Vinyl Chloride</b>	<b>Apparatus</b>
(i) Not over 10 ppm	Any chemical cartridge respirator with a vinyl chloride cartridge which provides a service life of at least 1 hour for concentrations of vinyl chloride up to 10 ppm.
(ii) Not over 25 ppm	(A) A powered air-purifying respirator with hood, helmet, full or half facepiece, and a canister which provides a service life of at least 4 hours for concentrations of vinyl chloride up to 25 ppm, or (B) Gas mask, front or back-mounted canister which provides a service life of at least 4 hours for concentrations of vinyl chloride up to 25 ppm.
(iii) Not over 100 ppm	Supplied air respirator demand type, with full facepiece.
(iv) Not over 250 ppm	Type C, supplied air respirator, continuous flow type, with full or half facepiece, helmet or hood
(v) Not over 3,600 ppm	Combination Type C supplied air respirator, pressure demand type, with full or half facepiece and auxiliary self-contained air supply.
(vi) Unknown, or above 3,600 ppm	Open-circuit, self-contained breathing apparatus, pressure demand type, with full facepiece.

- (d) Where air-purifying respirators are used:
  - (i) Air-purifying canisters or cartridges must be replaced prior to the expiration of their service life or the end of the shift in which they are first used, whichever occurs first, and
  - (ii) A continuous monitoring and alarm system must be provided when concentrations of vinyl chloride could reasonably exceed the allowable concentrations for the devices in use. Such system shall be used to alert employees when vinyl chloride concentrations exceed the allowable concentrations for the devices in use, and
  - (iii) Respirators specified for higher concentrations may be used for lower concentration.

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**WAC 296-62-07329 (Cont.)**

**(8) Hazardous operations.**

- (a) Employees engaged in hazardous operations, including entry of vessels to clean polyvinyl chloride residue from vessel walls, shall be provided and required to wear and use;
  - (i) Respiratory protection in accordance with subsections (3) and (7) of this section; and
  - (ii) Protective garments to prevent skin contact with liquid vinyl chloride or with polyvinyl chloride residue from vessel walls. The protective garments shall be selected for the operation and its possible exposure conditions.
- (b) Protective garments shall be provided clean and dry for each use.
- (c) Emergency situations. A written operational plan for emergency situations shall be developed for each facility storing, handling, or otherwise using vinyl chloride as a liquid or compressed gas. Appropriate portions of the plan shall be implemented in the event of an emergency. The plan shall specifically provide that:
  - (i) Employees engaged in hazardous operations or correcting situations of existing hazardous releases shall be equipped as required in subdivisions (a) and (b) of this subsection;
  - (ii) Other employees not so equipped shall evacuate the area and not return until conditions are controlled by the methods required in subsection (6) of this section and the emergency is abated.

**(9) Training.** Each employee engaged in vinyl chloride or polyvinyl chloride operations shall be provided training in a program relating to the hazards of vinyl chloride and precautions for its safe use.

- (a) The program shall include:
  - (i) The nature of the health hazard from chronic exposure to vinyl chloride including specifically the carcinogenic hazard;
  - (ii) The specific nature of operations which could result in exposure to vinyl chloride in excess of the permissible limit and necessary protective steps;
  - (iii) The purpose for, proper use, and limitations of respiratory protective devices;
  - (iv) The fire hazard and acute toxicity of vinyl chloride, and the necessary protective steps;
  - (v) The purpose for and a description of the monitoring program;
  - (vi) The purpose for and a description of, the medical surveillance program;
  - (vii) Emergency procedures:
    - (A) Specific information to aid the employee in recognition of conditions which may result in the release of vinyl chloride; and
    - (B) A review of this standard at the employee's first training and indoctrination program, and annually thereafter.

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**WAC 296-62-07329 (Cont.)**

- (b) All materials relating to the program shall be provided upon request to the director.
- (10) **Medical surveillance.** A program of medical surveillance shall be instituted for each employee exposed, without regard to the use of respirators, to vinyl chloride in excess of the action level. The program shall provide each such employee with an opportunity for examinations and tests in accordance with this subsection. All medical examinations and procedures shall be performed by or under the supervision of a licensed physician and shall be provided without cost to the employee.
  - (a) At the time of initial assignment, or upon institution of medical surveillance;
    - (i) A general physical examination shall be performed with specific attention to detecting enlargement of liver, spleen or kidneys, or dysfunction in these organs, and for abnormalities in skin, connective tissues and the pulmonary system (see Appendix A).
    - (ii) A medical history shall be taken, including the following topics:
      - (A) Alcohol intake,
      - (B) Past history of hepatitis,
      - (C) Work history and past exposure to potential hepatotoxic agents, including drugs and chemicals,
      - (D) Past history of blood transfusions, and
      - (E) Past history of hospitalizations.
    - (iii) A serum specimen shall be obtained and determinations made of:
      - (A) Total bilirubin,
      - (B) Alkaline phosphatase,
      - (C) Serum glutamic oxalacetic transaminase (SGOT),
      - (D) Serum glutamic pyruvic transaminase (SGPT), and
      - (E) Gamma glutamyl transpeptidase.
  - (b) Examinations provided in accordance with this subdivision shall be performed at least:
    - (i) Every 6 months for each employee who has been employed in vinyl chloride or polyvinyl chloride manufacturing for 10 years or longer; and
    - (ii) Annually for all other employees.
  - (c) Each employee exposed to an emergency shall be afforded appropriate medical surveillance.
  - (d) A statement of each employee's suitability for continued exposure to vinyl chloride including use of protective equipment and respirators, shall be obtained from the examining physician promptly after any examination. A copy of the physician's statement shall be provided each employee.
  - (e) If any employee's health would be materially impaired by continued exposure, such employee shall be withdrawn from possible contact with vinyl chloride.

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**WAC 296-62-07329 (Cont.)**

- (f) Laboratory analyses for all biological specimens included in medical examinations shall be performed in laboratories licensed under 42 CFR Part 74.
- (g) If the examining physician determines that alternative medical examinations to those required by subdivision (a) of this subsection will provide at least equal assurance of detecting medical conditions pertinent to the exposure to vinyl chloride, the employer may accept such alternative examinations as meeting the requirements of subdivision (a) of this subsection, if the employer obtains a statement from the examining physician setting forth the alternative examinations and the rationale for substitution. This statement shall be available upon request for examination and copying to authorized representatives of the director.

**(11) Signs and labels.**

- (a) Entrances to regulated areas shall be posted with legible signs bearing the legend:

**CANCER-SUSPECT AGENT AREA AUTHORIZED PERSONNEL ONLY**

- (b) Areas containing hazardous operations or where an emergency currently exists shall be posted with legible signs bearing the legend:

**CANCER-SUSPECT AGENT IN THIS AREA PROTECTIVE EQUIPMENT REQUIRED AUTHORIZED PERSONNEL ONLY**

- (c) Containers of polyvinyl chloride resin waste from reactors or other waste contaminated with vinyl chloride shall be legibly labeled:

**CONTAMINATED WITH VINYL CHLORIDE CANCER-SUSPECT AGENT**

- (d) Containers of polyvinyl chloride shall be legibly labeled:

**POLYVINYL CHLORIDE (OR TRADE NAME) CONTAINS VINYL CHLORIDE VINYL CHLORIDE IS A CANCER-SUSPECT AGENT**

- (e) Containers of vinyl chloride shall be legibly labeled either:

**VINYL CHLORIDE EXTREMELY FLAMMABLE GAS UNDER PRESSURE CANCER-SUSPECT AGENT (or)**

- (f) In accordance with 49 CFR Part 173, Subpart H, with the additional legends:

**CANCER-SUSPECT AGENT**

Applied near the label or placard.

- (g) No statement shall appear on or near any required sign, label or instruction which contradicts or detracts from the effect of any required warning, information or instruction.

**(12) Records.**

- (a) All records maintained in accordance with this section shall include the name and social security number of each employee where relevant.

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**WAC 296-62-07329 (Cont.)**

- (b) Records of required monitoring and measuring and medical records shall be provided upon request to employees, designated representatives, and the director in accordance with chapter 296-802 WAC. These records shall be provided upon request to the director. Authorized personnel rosters shall also be provided upon request to the director.
    - (i) Monitoring and measuring records shall:
      - (A) State the date of such monitoring and measuring and the concentrations determined and identify the instruments and methods used;
      - (B) Include any additional information necessary to determine individual employee exposures where such exposures are determined by means other than individual monitoring of employees; and
      - (C) Be maintained for not less than 30 years.
    - (ii) Medical records shall be maintained for the duration of the employment of each employee plus 20 years, or 30 years, whichever is longer.
  - (c) In the event that the employer ceases to do business and there is no successor to receive and retain his/her records for the prescribed period, these records shall be transmitted by registered mail to the director, and each employee individually notified in writing of this transfer. The employer shall also comply with any additional requirements set forth in chapter 296-802 WAC.
  - (d) Employees or their designated representatives shall be provided access to examine and copy records of required monitoring and measuring.
  - (e) Former employees shall be provided access to examine and copy required monitoring and measuring records reflecting their own exposures.
  - (f) Upon written request of any employee, a copy of the medical record of that employee shall be furnished to any physician designated by the employee.
- (13) **Reports.**
- (a) Not later than 1 month after the establishment of a regulated area, the following information shall be reported to the director. Any changes to such information shall be reported within 15 days.
    - (i) The address and location of each establishment which has one or more regulated areas; and
    - (ii) The number of employees in each regulated area during normal operations, including maintenance.
  - (b) Emergencies and the facts obtainable at that time, shall be reported within 24 hours to the director. Upon request of the director, the employer shall submit additional information in writing relevant to the nature and extent of employee exposures and measures taken to prevent future emergencies of similar nature.

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**WAC 296-62-07329 (Cont.)**

- (c) Within 10 working days following any monitoring and measuring which discloses that any employee has been exposed, without regard to the use of respirators, in excess of the permissible exposure limit, each such employee shall be notified in writing of the results of the exposure measurement and the steps being taken to reduce the exposure to within the permissible exposure limit.

**(14) Appendix A supplementary medical information.**

**APPENDIX A SUPPLEMENTARY MEDICAL INFORMATION**

When required tests under subsection (10)(a) of this section show abnormalities, the tests should be repeated as soon as practicable, preferably within 3 to 4 weeks. If tests remain abnormal, consideration should be given to withdrawal of the employee from contact with vinyl chloride, while a more comprehensive examination is made.

Additional tests which may be useful:

- (A) For kidney dysfunction: Urine examination for albumin, red blood cells, and exfoliative abnormal cells.
- (B) Pulmonary system: Forced vital capacity, forced expiratory volume at 1 second, and chest roentgenogram (posterior-anterior, 14 x 17 inches).
- (C) Additional serum tests: Lactic acid dehydrogenase, lactic acid dehydrogenase isoenzyme, protein determination, and protein electrophoresis.
- (D) For a more comprehensive examination on repeated abnormal serum tests: Hepatitis B antigen, and liver scanning.

[Statutory Authority: RCW 49.17.010, .040, .050, and .060. 05-03-093 (Order 04-41), § 296-62-07329, filed 01/18/05, effective 03/01/05. Statutory Authority: RCW 49.17.010, .040, .050, and .060. 04-10-026 (Order 03-04) § 296-62-07329, filed 04/27/04, effective 08/01/04. Statutory Authority: RCW 49.17.010, .040, .050. 99-10 (Order 98-10) § 296-62-07329, filed 05/04/99, effective 09/01/99. Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-62-07329, filed 7/20/94, effective 9/20/94; 91-03-044 (Order 90-18), § 296-62-07329, filed 1/10/91, effective 2/12/91. Statutory Authority: RCW 49.17.040 and 49.17.050. 86-16-009 (Order 86-28), § 296-62-07329, filed 7/25/86; 82-13-045 (Order 82-22), § 296-62-07329, filed 6/11/82. Statutory Authority: RCW 49.17.040, 49.17.050 and 49.17.240. 81-18-029 (Order 81-21), § 296-62-07329, filed 8/27/81; 81-16-015 (Order 81-20), § 296-62-07329, filed 7/27/81; Order 75-41, § 296-62-07329, filed 12/19/75.]